

ABSTRACT

An inexpensive piezoelectric single-crystal device being excellent in the piezoelectric characteristics and having a complex perovskite structure can be provided by adding a specific additive to a lead magnesium niobate-lead titanate (PMN-PT) single crystal or a lead zinc niobate-lead titanate (PZN-PT or PZNT) single crystal. Specifically, the piezoelectric single crystal has a complex perovskite structure and is formed of a composition containing 35 to 98 mol% lead magnesium niobate $[\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3]$ or lead zinc niobate $[\text{Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3]$, 0.1 to 64.9 mol% lead titanate $[\text{PbTiO}_3]$, and 0.05 to 30 mol% lead indium niobate $[\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3]$ wherein calcium is substituted for 0.05 to 10 mol% lead in the composition.